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SOME HOLIDAY NOTES FROM BREYDON.

By Arthur H. Patterson, A.M.B.A.

My summer holidays, correctly speaking, start when the schools break up—when the slums and alleys and wandering children are for a time forgotten in my perambulations among the mud-flats and the vagrant birds that haunt them. All other days, too, that I can spare to visit Breydon are *holidays*.

Turning over the pages of my 'Note-book,' a few entries strike me as being of sufficient interest to include in this series. The persecution of the Coots* driven out from the frozen broadlands went on well into February; my entry for Feb. 4th is as follows:—"Coots still about Breydon, many miserable creatures hopping about on one leg from shot-broken limbs. Poor wretches!"

The smallest Pink-footed Goose I ever saw was killed at Buckenham during the second week in February. I regret I was unable to take its dimensions. About two hundred Wigeon visited Breydon, March 9th.

On March 31st I was sailing across the submerged flats when I observed a large Gull busily engaged on some long white object, which I soon made out to be a large Eel as thick as my wrist. I got almost within punt's length of it before it reluctantly took to wing, when I pulled the defunct fish into the boat; its head had been picked to pieces, a process undoubtedly

* *Cf.* 'Zoologist,' *ante*, p. 85.

begun the day before by a Heron, who found it "too large an order" to swallow. I showed it to the watcher, who envied me my possession, and it afterwards, accompanied by onions, made, he tells me, "a rattling good dinner" for him.

A young Spoonbill most obligingly alighted on the edge of a flat in front of my houseboat, and started a thorough overhauling of his already spotless plumage. With my glasses in one hand and a pen in the other, I knelt in my stern-sheets, using my hatch for a desk, and roughly dashed on a slip of waste-paper six very unorthodox attitudes, which no sane taxidermist would ever dare display in setting up a specimen. The accompanying illustrations, taken in less minutes than in number, are probably the only ones ever secured under similar circumstances. This was on May 11th.

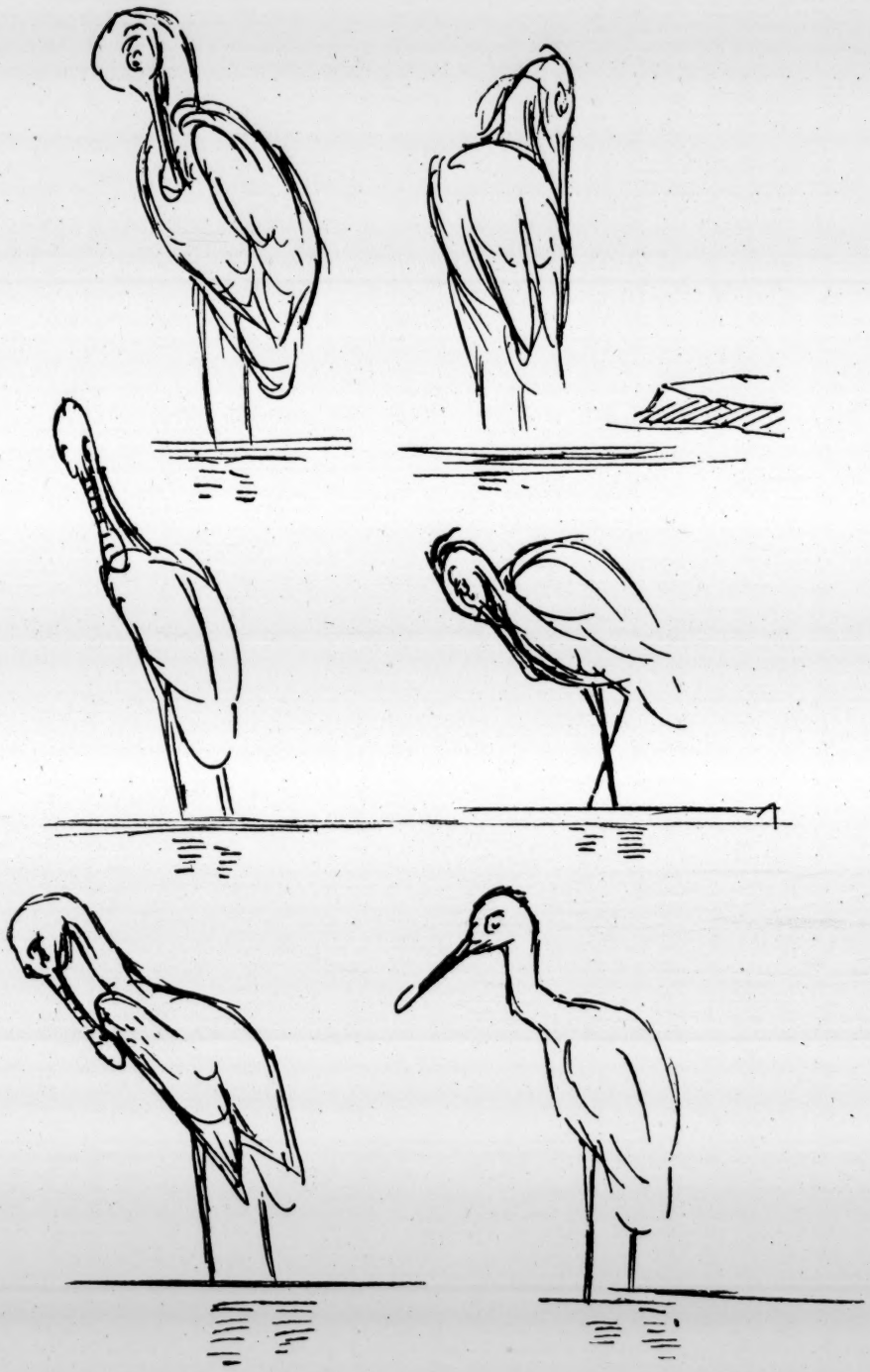
On May 12th, fifty-two Grey Plovers—beauties! dropped in.

The manners of a Cuckoo, restlessly flitting about near the railway, not far from my houseboat, attracted my attention on May 18th. From its mouth depended a large black object which I have little hesitation in deciding was a slug—one of those big ditch-side prowlers, *Arion ater*; it seemed much too large to swallow, and I hoped, by harassing its captor, it would drop it for my especial edification, but I was disappointed. It would be interesting if it could be proved beyond a doubt that *Cuculus* occasionally preys on *Limacidæ*.

Several Knots "in the red" of spring-time visited Breydon on the 25th. The watcher assured me that on the 13th a flock of between fifty and sixty came to the flats; a rare thing nowadays, for this bird which visited us in the spring in large flocks in the sixties very rarely puts in an appearance on the spring migration.

I saw two very immature Spoonbills on June 7th. The visits of this species were very few during the season. The congregating of Starlings on the prostrate *Zostera* at low water, on their hunting trips for mudworms and stranded crustaceans, was a marked feature this year.

During the early part of August the Black-headed Gulls spent much of their time picking mudworms (*Nereis*) out of the ooze. They are very quick in snatching out the luscious worm, often running to the edge of the "drain" in order to wash it. I tried



SPOONBILL'S TOILET.

the birds with some fish-bones, not half-picked by myself, but, although many came quite close in order to satisfy their curiosity, they utterly ignored them and hastily resumed their worm-catching.

On the 13th they (the Gulls) and the many Common Terns then frequenting Breydon had a rare afternoon's profitable sport in picking up small Herrings (syle) stranded in numbers on the flats left by the receding tide before they could "draw down" into the channel, and into comparative safety.

A most unusual number of Common Terns used Breydon all through August, many of them birds of the year, and with them now and again small lots of Arctic Terns were seen. On easterly winds, when the water is "sheer" (*i.e.* very clear), the fish swim lower, and are more alert. On such occasions the Terns fished with greater impetuosity, often throwing themselves into the water from a height of fifteen feet, submerging themselves all but their primaries and half of the tail. Their frequent hovering, after the manner of Kestrels, and their Gannet-like plunges, were exceedingly interesting to watch. Terns are wonderfully pugnacious. Sometimes they quarrelled among themselves, and every stray Rook that crossed Breydon was set upon most energetically by some spirited bird, who chased and harried the corvine until both would be almost lost to sight overhead, each one endeavouring to get above the other.

On the 21st (August) two or three Terns flew past the watcher's boat, wherein I stood watching them, accompanied by several Black-headed Gulls; these imitated the smaller birds both in hovering and endeavouring to go below the surface, and clumsily as they performed this attempt, I noticed on several occasions they secured a small Herring. The fish, owing to the water being muddled and thick, swam nearer the surface. Mimicry of action is not a strong point with different species, but in this instance it was not only entertaining but profitable to the Gulls. Never did I see one, among the many Terns present, alight on the water; they do not appear to like wet feet. They will rest and preen themselves upon the drier muds, but prefer to settle on some inverted basket or other stranded object, and will crowd together on a bit of stump or timber. Scores remained with us until the shooting began on Sept. 1st, when many a one

who reckoned himself a sportsman made common cause against them. Scores were slain ere the remnant took the hint to go south; those killed were eventually thrown in the refuse-box as useless.

I was sufficiently interested in some plump young Herrings we captured one day in the watcher's Smelt-net to dissect them, and found their stomachs packed with Opossum Shrimps.

The Greenshank very much interested me this summer, and hardly a day passed but its clear ringing notes were heard on Breydon. Mostly in twos and threes this species haunts the rond-corners, where little pools and small runs afford easy captures of small crustaceans and worms. The Greenshank is a restless, impulsive creature, and runs its sturdy mandibles in quick zigzag fashion in the shallow water, forming a continuous series of figure 8's without a break, differing in these respects from the Redshanks, which prefer usually to keep to the ooze and probe for mudworms, forming also figure 8's, but separate and complete. The Redshanks also like to pick up with dainty action crustaceans stranded among the semi-marine vegetation.

One afternoon I observed a Greenshank feeding, *hopping on one leg* as it proceeded. Watching it for some time, I naturally came to the conclusion that it had lost one leg by accident—by a gun-shot perhaps; but suddenly the hitherto hidden leg shot out, and the bird industriously scratched its head! It flew towards another of the same species, which itself was actually hopping on one leg; and they hopped in concert! From subsequent observations made, I feel safe in saying, I think, that it is a feature with the Greenshank, and practised more from caprice than necessity. Herring-syle, which this species might easily have captured this season, was not sought for by it. On one occasion I observed a Greenshank playing with a small Herring, finally dropping it as if half-reluctantly, and resuming its worming.

Curlews visited us in some numbers late in August, and one evening, at closing-in time, fully two hundred came to an adjoining flat. I wish this noble bird could be absolutely and entirely protected. We have lost the Avocet, and some other erstwhile British-breeding birds. Why not make sure to preserve this

quaint and favourite species? Why wait until it shall verge on extinction?

Late in August, I one day crept up a bank and peered over into a marsh, up one low-lying corner of which was a puddle not twenty feet in circumference. I was delighted to see in and around it nine Redshanks, one Greenshank, three Lapwings, three or four Gulls, three Ringed Plovers, and three huge farm-horses, around whose legs some of the birds stood airing their freshly-washed clothes. Such a little "happy family" was, to me, intensely interesting.

I watched two young and stupidly tame Knots on Aug. 30th, which fed within a few feet of my punt as I lay observing their tactics. This sluggish bird feeds in a very leisurely way, probing the mud less than half a bill's length, and swallowing a captured mudworm with a shaky little movement of the head without bringing it to a level with its shoulders. And while the pert Ringed Plover scours over a superficial acre of ooze, the Knot is content in probing an area that might be covered with a blanket.

On Sept. 18th, hundreds—some five hundred at least—of Starlings were busily feeding and squabbling on a low part of a Breydon marsh, smothered with the purple Michaelmas daisy. A gunner, who let two barrels into them, secured two dozen, mostly young birds with dingy brown heads. Being interested to know for what purpose they had congregated, I purchased a number and dissected them, finding their gizzards crammed with a mass of matted stuff which resembled cocoa-nut fibre, which on separating resolved itself into scores of legs of the "daddy long-legs" (*Tipula*); the softer bodies and the wings (if they actually swallowed them) were reduced to an indefinable pulp. A number of *Hydrobiidæ* and Shorehoppers (*Orchestia littorea*), with some beetles, and in one instance a winkle, were the only other objects I discovered. The huge number of these destructive pests the Starling must make off with ought to be favourably noticed by the farmer and the gardener, the latter of whom might forgive it the few mulberries it manages to pilfer from his trees.

OBSERVATIONS TENDING TO THROW LIGHT ON THE QUESTION OF SEXUAL SELECTION IN BIRDS, INCLUDING A DAY-TO-DAY DIARY ON THE BREEDING HABITS OF THE RUFF (*MACHETES PUGNAX*).

By Edmund Selous.

(Concluded from p. 182.)

April 30th, 1906.—In the course of this record I have more than once had occasion to mention a certain bird of very distinctive appearance who seemed to have no settled abiding-place of his own, and was constantly getting into the way of other male birds by lying crouched in their particular quarters, from which, when occupied with the Reeves, they endeavoured, by frantic peckings and draggings—but by no means always successfully—to expel him. An incident witnessed by me on the morning of the above date, and several times repeated, throws a new and unexpected light on the significance of this bird's behaviour, but, in regard to it, I shall only here say that in its essential nature it somewhat resembled one which will be well known to students of ant-life, the theft, namely, habitual and premeditated by a certain parasitical or "guest" insect, living in the nest, of a drop of honey which is in the act of being given by one ant to another. Passing to the afternoon, there was considerable fighting between several Ruffs on one side of the ground for the favours of some Reeves who had repaired there. Two of these birds were successful in their pretensions, but it did not appear to me that their success was due to superior prowess on their part, for, in this respect, all seemed much alike. Simply the Ruffs fought and the Reeves chose, but the general result of the commotion and storm was to bring nuptial matters to an end in this quarter, the Reeves going over to the brown bird, who stood on the opposite side of the gathering-ground, with whom they likewise entered into conjugal relations. In this, I speak of the Reeves as a body,

but, there being several of them, I was unable positively to say whether the same individuals attached themselves, in this manner, to two or more birds in succession. Later, however, I saw a clear instance of polyandry on the part of one Reeve, at any rate, and there were signs of it, also, in others. The Reeve in question went twice from one Ruff to another—the same two in both cases—and the nuptial rite was performed with each in turn. The greater severity of the fighting was also, to-day, very noticeable. I also made the discovery of what seems to be another and much smaller meeting-ground. Some five or six Ruffs stood there in quite the characteristic manner, and strained up and whisked their wings forward when any other bird flew by. This they would do though the flying birds were far off. Once, indeed, I could not see them, but the action is too characteristic for its cause to be matter of doubt. Looking through the glasses, I did not recognize these birds, so that possibly we may have here a smaller independent gathering. If so, however, it will be contrary to the opinion of those who should best know these breeding-grounds.

May 1st.—I was down at 3 this morning, but have nothing special to note. It was the same scene as yesterday, but up to 6, when the cold and discomfort drove me out, not nearly so pronounced. At first the Reeves showed a marked preference for a certain bird—a star that has lately risen—which I may call the black Ruff, since his ruff is of that colour, or at least dark. This bird was very active and vigorous, darting about and fighting, or ready to fight, with any others; but whether he was more so than several of these others, with whom he several times encountered, I cannot say. It is easy, of course, to make his success with the Reeves the criterion of this, and to say he was—but that is to argue in a circle. It must be remembered that, during the first two or three days of the pairing—as far as I saw it—this bird had not obtained favour. The Reeves had then a most decided preference for a certain brown Ruff, and, after him, for another whose ruff was of a blue, or bluey-black, colour. Both these birds are fine, handsome males, but neither of them have made themselves especially pre-eminent as fighters, and the brown one, especially, has shown a strong predilection for the particular spot where he always stands or sits. If worried, or

apprehensive, whilst paying his attentions to the Reeves, he would make a rush or two, usually in one direction, against birds on the outer part of the territory, that I have not seen pair—the nuptial plumage, indeed, of several of these is not yet much advanced. On one or two occasions I have seen him come into collision with the other favoured Ruff, whose place is next his, but though these few encounters—I can only recall two—were brisk and spirited, they were only of some seconds' duration, and seemed to be equal, or rather negative, in regard to results. In fact, though a powerful bird and equal, probably, to anything that may come in his way, he seems, for a Ruff, to be of rather a peaceable disposition, and is also more sedentary than any of the others. Much the same may be said in regard to the blue bird—who is also very fond of keeping still in his place—though his contests, in the last few days, owing to the chance of his position, have been more numerous. Though generally holding his own on these occasions, I certainly cannot say that he has done so more than several other birds with whom he has fought, and to all of whom he has been, till lately, preferred. There are, for instance, two, a good deal like himself—especially one—but from whom he is easily distinguished by the very striking character of his creamy head-plumes, and another black, or dark-ruffed one—not the favourite that I have mentioned—who seem to be quite his equals, and with the two first of whom I have seen him have several short fights, wherein he gained no apparent advantage. If there is a difference, however, I should say that he was not quite the equal in prowess of these birds,* and not so active as one of them—the black-ruffed one aforesaid, who seems a very energetic bird. Yet none of the three, nor any other bird except the brown, and now the successful black one, have had anything like the favours that have been accorded to him.

In the early days I was struck by the way in which the Reeves repaired to this bird, and, still more markedly, to the brown one—by neither of whom, most certainly, have they, in

* Such an opinion, however, is of little or no value. The fact is that the fighting is not sufficient, or sufficiently sustained for this point (of which so much is made by those who ignore the real one, the power of the hen, namely) to *come out*.

any sense of the word, been won by fighting, or by any kind of physical activity—whilst leaving all others neglected. Then came coitions, far less frequent, with three or four other birds—perhaps six in all, I do not think more—and now this black-maned lion has become, apparently, the favourite, for the Reeves—it was so yesterday, and has been so again this morning—go to him before they do to the brown or the blue one. Still, they have never abandoned these, and, as far as numbers are concerned, there have never been more at the disposal of this later fancy than at that of the brown bird, at any rate. Yesterday they came down to the latter in a little crowd, and this morning it was much the same thing, though he paired less often than yesterday, or usually. This, however, was not for want of invitations.

How does the case stand then—as far as it is possible to follow anything so long, so intricate, and which one can only observe at intervals, and not from beginning to end? *If* the black-ruffed bird won the Reeves through his fighting qualities—of which I have not seen sufficient evidence—yet, most assuredly, neither the brown- nor the blue-ruffed one did. Yet these two were chosen first, during a comparatively quiet period, when fighting was not nearly so much in evidence as now; so that, having secured harems before anyone else, they should be the fathers of a good many first broods, which, by having been hatched early, would allow their mates good time in which to lay again; and, moreover, it seems but reasonable to suppose that they would secure a certain number of other Reeves later. This ought to make their characteristics predominant in the descendants left by the community in that particular year, and if there were only the same Ruffs and Reeves during following years, the process, it seems likely, would be continued, for, even if old attachments were not remembered, the tastes which had produced them would, in all probability, remain the same. Should new birds, however, join the community, this might introduce a disturbing element, but I cannot learn from inquiry that the number of the Ruffs on these shore-lands is increasing from year to year. I cannot help thinking, myself, however, that, as the Ruffs are undoubtedly polygamous, so are the Reeves polyandrous—in fact, that there must be promiscuity, though

perhaps to a lesser extent in the one sex than in the other. Yet this, to go by what I have seen, would hardly complicate the question of sexual selection. For instance, though all the Reeves were to pair with all the Ruffs, yet those to whom they first united themselves would be more likely to become the parents of the first brood of young than any of the others would be, and so would have the best chance of transmitting their qualities, unless, indeed, the intervals between the first and subsequent unions were of very short duration, and this, according to my observations, was far from being the case. After the hatching-out of the first brood it is reasonable to suppose that the Ruffs by whom any Reeve had been first attracted would prove attractive to her in the same degree again, or, at any rate, would have a better chance of being first chosen.

The reasons which make me think that all or most of the Reeves have paired with all the Ruffs that have been chosen amongst them are the following:—First, there is the definite instance which I have already mentioned. Secondly, I have seen the wish and intent expressed by other Reeves, either through direct solicitation or general deportment. Thirdly, this morning —and I have noted it several times before—the pairing took place, first, on one part of the ground, with the black-ruffed bird especially, and then, considerably later, on another part, with the brown bird especially. As the Reeves did not stay on the ground during the whole interval, I cannot be sure that they were the same in each case, but they came back in a way which makes me think they were, and their numbers were the same or about the same. I cannot help thinking, therefore, that they were the same individual Reeves. Again, if it were a different batch of Reeves that went to the brown Ruff, say, and to the black and other new ones, in a different part of the ground, why should the time for these visits have changed? Why should the same batch, to put it another way, go to a certain bird—an old favourite—at a later time than they used to, if they went to him only? Would they not be likely, after the recuperation of their sexual energies during the night, to feel, as they did before, an early inclination, and gratify it accordingly? But if, as I suspect, the same birds go in batches from one Ruff to another, then the rotation of their visits would be according to the strength

of their inclinations, and we can understand a new fancy taking precedence of an old one. Lastly, the largest number of undoubted Reeves that I have seen on the ground, together, has been thirteen, which, with one away, that I remember, makes fourteen. If we suppose these to be all the Reeves, and if each Ruff that pairs here has a harem, then, allowing six apiece for the brown and the blue one—nor do I think it can be less—this only leaves two between the other four or six.* But the black Ruff's harem must now, I should think, amount to six also, or, at any rate, to four. Without promiscuity, therefore, the numbers would not be sufficient, and even if there be twenty-two Reeves, which is the largest number of Ruffs I have been able to count on the ground, this would still only leave ten between the four or six birds other than the brown and blue ones. Though I cannot feel sure about it, therefore, it seems to me more likely, on the whole, that the Reeve distributes her favours amongst several males. This, at any rate, is very clear, that the male Ruff does not take pains to collect Reeves together, and guard them against rivals. Only in exceptional circumstances have I seen anything like jealousy, and even to these, indeed, the word could hardly be applied. The Ruffs, in fact, do not really seek the Reeves. Rather they are sought by them, and when they have done with them they seem quite indifferent as to where they go or what they do. The two Ruffs with which the Reeve I have spoken of paired successively were quite close together, yet neither of them made the least objection, nor is anything more noticeable than that, as a general rule, to which there are but few exceptions, pairing Ruffs are not interfered with by others. Neither do the Reeves show jealousy, though it would be impossible to be more jealous than female birds can be. The general look of things, in fact, suggests promiscuity.

It was this morning that I saw the longest fight between two Ruffs that I have yet witnessed. I cannot say precisely how long it lasted, not having taken out my watch until some time after it had begun, but it was certainly, I think, under five minutes. These birds fought like demons, and, at the end, I noticed that the white ruff of one of them was crimsoned, here

* I have reason to think that the breeding operations of both the sexes are confined to one meeting-place. (See pp. 369, 377.)

and there, about the throat. Yet neither of the two, as far as I can judge, have yet united themselves with any Reeves, nor have the latter made any advances to them. They have never done anything more, in fact, than dance about at their posts, whilst more fortunate males were being chosen on other parts of the ground. Nor were any Reeves near them at the time of this fight—at least I did not see any, though some were present. These and similar facts incline me to believe that though the fighting of male birds in the breeding-time is, in its origin, on account of the female, yet that it has now a tendency to develop as a separate factor.

May 2nd.—Down at about 6.30, much too late, but in time to see two clear cases of selection on the part of as many Reeves. The first one walked up to the black-ruffed bird—latterly so much distinguished—and touched him on the head with her bill. During the performance of the nuptial rite which followed upon this, three Ruffs, any one of them entirely a match for the chosen bird, stood close by, turned towards it with heads bowed in that strange set attitude which (as well as the quite prostrate one) Ruffs habitually assume in the presence of the Reeve, and which indicates strong sexual feeling. There were also several other Ruffs more or less near. It was impossible not to be very much struck with this. These three birds were all wooers of any Reeves who came to that part of the ground, and had actually been so, if I mistake not, of this very one, on the way to the Ruff of her choice. They were rivals, in fact, yet they stood thus submissive to the choice of the Reeve. I know not, at any rate, what other interpretation to put upon their behaviour, and, if it be the correct one, it certainly bears witness, in a remarkable manner, to the truth of Darwin's views, those views which have received so little justice in the only way that justice can ever be done to them—that of careful and prolonged observation.

Coming to the second example of selection on the part of a Reeve—the second, I mean, this morning—in this instance the choice, though quite as apparent, was not so successfully made. The Reeve in question walked down towards a fine brown-ruffed bird whose head-plumage was of a deep chocolate colour, approaching to black. On her way she was courted by a fine and

very active and vigorous black-ruffed bird, but with him she would have nothing to do; but, after pausing a little and turning her head with a curious expression that, immediately preceding, as it did, her further onward course, had remarkably the appearance of an adverse decision, she went on to the other one, to whom she unmistakably manifested her partiality. The rival Ruff, however, now ran up, when a scuffle of no duration, and having no particular result, ensued between the two. They were then again separated, and the Reeve, going up to the same bird, invited him as before, but still more markedly. But again the black Ruff intervened (this was before the rite had begun, or was actually on the point of beginning), there was another scuffle, and, as the result of this, he retreated. Here then was a very decided case of partiality—twice shown—and the bird chosen was the victor in the second encounter—in my opinion as the direct result of the favour bestowed on him.* Now, then, one might have expected to see the rite consummated, but these scenes, apparently, had not been to the taste of the Reeve, and after standing, for a little, with a hesitating demeanour, she flew off. Disturbal had influenced her more than the victory of the bird for whom she had shown the most unmistakable preference. Theoretically devoted to "vigour," it had not attracted her even when favourable to her desires. In all probability, however, she would not have acted in the same way, in the quite early morning, but later, after the first saturnalia, the Reeves, as I have often noticed, are much more modest in their deportment, and the Ruffs themselves show less ardour. Such times are often more favourable for detecting the true actions and motives of the female than when these are more apt to be obscured by the general commotion and excitement that obtain.

In the afternoon I am at the watch-house about 4. There is a considerable amount of activity, nine or ten Reeves being sometimes on the ground together, the Ruffs varying in numbers from about that to some fifteen. Of these only four are paid any attention to by the Reeves, *viz.* the brown, the blue, the black, and the brown-ruffed and black or chocolate-headed bird

* A bird's energy in battle is in proportion to the impulse from which it springs, and this factor is of such importance that it needs a great deal of physical inequality to nullify it.

of the last-mentioned incident. The selection on the part of the Reeves is most evident. They take the initiative throughout, and are the true masters of the situation. Quiet and unobtrusive as they are, compared to the Ruffs, their whole manner betrays conscious power. When several are crowded together the effect of this is much lost, as is natural, but it is often very marked with single birds. Though there are some dozen cases of coition, there is not one of interference during the act itself, one only immediately preceding it. Acquiescence in the Reeve's choice, by every other bird on the ground, is the general and marked feature.* My statement as to the three Ruffs who, this morning, so prominently exemplified this law, being all equal, as fighters, to the favoured rival, was fully borne out by the fighting between all four of them this afternoon. The brown-and-black Ruff, too, seemed inferior, if anything, to the black one whom he defeated in the morning, though, to be sure, that was a small affair, and so were these. Short tussles, in which one bird desists before the other, rather than is defeated by him, are the common feature. Prolonged, envenomed fights are rare.

Later on, the second of two coitions was interfered with, almost in the act, by a Ruff that ran from the other end of the ground. This was a bird who had received no notice, himself, from any Reeve. Such cases are very rare.

May 3rd.—On the spot about 5 a.m. It was raining and blowing as I walked down, and soon came on to pour. This weather seemed to affect the birds. They were more erratic, I thought, ran about more widely, got more out of their places. Pairing took place, but not frequently, whilst I was there. I only saw it with two Ruffs, the usual all-brown one, and another of the brown-ruffed birds, with black or deep chocolate-coloured head, who stands on the opposite side of the ground to where the other one, who has paired before, does. This is a fine, well-made bird, who has ruffled, and fought before any Reeve that came near him, day after day, with the rest. But all this has been of no avail, and until now, when a Reeve comes deliberately to him and may be said to court him, he has never entered into nuptial relations whilst under my observation, nor, as I feel sure, at all. He can fight, too, as far as I can see, as well as another, but

* *Cf.* also *ante*, pp. 293 and (1906) 424.

fighting, or the capacity to fight, has done nothing for him—he has had to wait until chosen. Nor can he have been chosen as the most vigorous bird, for not only is he not *specially* distinguished in this way, but, as the Reeves have not, hitherto, come much into his neighbourhood, he has had no particular opportunity of showing such extra vigour, did he possess it. Why, then, has he been chosen? All I can say is that he is a handsome bird, but this he has been all the time. But without a doubt, as it appears to me, and whatever the motive, on each occasion, may be, it is the Reeves who choose the Ruffs, and to them, and not to the latter, belongeth power. The very fact that the Ruffs have places where they stand and wait till the Reeves come to them—for a few dartings about over the course do not nullify this general truth—that they do not leave their end of the ground, when the Reeves are not there, and establish themselves at the other end, where they are, is almost, of itself, proof of this. The whole scene and course of events would be different if it was a mere matter of the hardest-fighting birds getting the greatest number of Reeves, and of the Reeves being won in this way. But, as far I can see, things could not proceed on this rude principle. It would be a mere chaos, hardly to be settled. Nature has worked it out much better. The Reeve, most undoubtedly, both has and habitually exercises the capacity of choosing, and her presence and personality affect the Ruffs in such a manner that her choice is generally respected. Even if, on any occasion, it is not, she has only to wait for another opportunity, nor can she ever, I believe, be made by force to act against her will. If unduly pressed or annoyed she can always, and often does, fly away. She is supreme, in fact, on the pairing-ground, but the position of the Ruffs is a far less satisfactory one. They have to await her good pleasure, and if the majority do not wait for it altogether in vain, as seems probable, they must do so, at any rate, judging by what I have seen, for a very considerable time.

I have now found the second Ruff pairing-ground, or, if the smaller place that looked like one be really so, the third. Of its existence I have been convinced for some time, but, hidden always in my dark observatory, it is only on this last day that I have had time to do anything outside it. However, here it is,

almost as large as the other, and lying, like it, amongst pieces of cut turf that have grown to the soil, having, in fact, just the same characteristics and appearance. During the time I watched it—lying flat on the ground at only a short distance—there were some ten or twelve Ruffs there as a maximum, but, more often, from five or six to seven or eight. Of Reeves there were, at one time, some eight or nine, but usually only one or two, or three or four—quite as peopled, therefore, as is the other resort at a similar hour. Here, again, I saw good evidence of the power of refusal possessed by the Reeves, for when pestered by Ruffs that they did not want, on their becoming too obstreperous, they, on several occasions, flew off. At length, however, at about 5.30, one of them walked over, in a way not to be misunderstood—or that I, at any rate, cannot now mistake—to a Ruff at the further side of the ground, who had been the least forward of any, choosing him out of, perhaps, half a dozen, and nuptial relations would certainly, thereupon, have been entered into had it not been for the backwardness of the Ruff itself. This Reeve, however, stayed by him, at first alone and then in company with some three or four other Reeves that subsequently flew in, and between one of this group and the Ruff in question coition was ultimately effected. I have little doubt, myself, that it was with the Reeve who had first singled him out, but, in any case, this bird had shown her partiality quite plainly before. To my eyes this particular Ruff—a stranger to the ground I have watched—seemed, rather, the plainest than the handsomest of those present. Closer inspection, however, showed that he had a full and ample ruff of speckled black and silver or silver-grey, with velvet-black head and head-plumes, and a face the naked skin of which was of a delicate greenish shade. Perhaps, therefore, though there are showier birds, this one is more æsthetically handsome. His ruff is really a very fine one. Here, then, is one more case of marked predilection on the part of the female bird.

This second pairing-ground is some three hundred and eighty paces from the other one, and almost in a straight line with it. As said before, it is almost if not quite as large as the other, and has the same appearance of having been habitually used by the birds year after year. It accounts for many new birds which

I have latterly seen at the old place, for, as I have remarked during the course of this afternoon, though each one has its more special *habitués*, they each fly from one to the other. This of course takes away all value from the fact of several very handsome Ruffs, as they seem to me, never having paired with any Reeve on the ground which I have been watching—or my never having seen them do so, to speak more precisely. They were not at their own club, so to speak, but merely visitors from another one. At this other one, where I have already seen several of them, they may be in as much request as the brown, blue, or black-maned birds have been here. And yet there is no particular reason why they should be. Since the males of this species differ so greatly from one another, there is no general type of coloration which might indicate a standard of taste, and why should the average Reeve's taste conform to our own? Moreover, our own would differ, but if we try to imagine an average one and compare it with that of the birds whose elections I have seen, the remarks which I have already made on this head* seem to me to apply. On this part of the subject, however, I do not wish to lay much stress. Much more evidence would be needed before, upon such observations, alone, one could arrive at any certain conclusion, and moreover it is clear to me that, if election is made by the female bird at all, it is made, in large measure, through the eye. But the Reeves do choose, they do make election, of that I have had clear evidence repeated again and again. Their partialities are as real as our own, and they are not founded on the fighting powers of the bird that is the object of them, nor yet made inoperative through these. What, then, is the exact significance of a pugnacity which does not appear to be of use to the male in proportion to the extent to which it has been developed in him? To answer this question it may be necessary to look to the past as well as to the present, for both are equally the province of evolution. That Ruffs, at one time, fought more and courted less, and that they will, as time goes on, fight still less and court still more, does not seem to me an altogether improbable supposition, in view of the state of things at present existing, for with much fighting—though less than is generally imagined, and rather collectively than indi-

* *Cf. ante*, pp. 165–6.

vidually—there seems but little need of it, and with every evidence of susceptibility, on the part of the Reeve, something yet seems wanting in the display of the male. I could almost imagine that, natural selection having first brought about the larger size, protective plumage and hard carunculated skin of the latter, sexual selection had more recently got to work on all three. What, in fact, could be a more potent solvent of masculine war-like prowess, as a factor in courtship, than an increasing supremacy of the will of the hen, which, not being influenced by such prowess, gradually rendered it nugatory? To this solvent, as it appears to me, the hardy virtues of the Ruff are in course of yielding. His fighting, more particularly when it has directly to do with the Reeve*—when her presence is the immediate cause of it—seems the outcome of a generalized state of excitement to which actual achievement bears no very fixed relation. For the most part it is vagrant, desultory, nor does it last long. Furthermore, the birds either do not hurt each other at all, or but very little, so that a remark made by the authors of an interesting paper on the sexual relations of spiders, to which I have before referred (*ante*, p. 210), would apply almost as well here. It is this:—"The males were rushing hither and thither, dancing opposite now one female and now another. Often two males met each other, when a short passage of arms followed. The males were very quarrelsome and had frequent fights, but we never found that they were injured. Indeed, after having watched hundreds of seemingly terrible battles between the males of this and other species, the conclusion has been forced upon us that they are all sham affairs, gotten up for the purpose of displaying before the females, who commonly stand by interested spectators." It is something like this with the Ruffs. Some influence seems at work to turn into mere pageantry the grim reality of war. I do not say that the battles—even the shortest—are fictitious—far from it—or entered into with any conscious idea of display, merely, nor have I observed that the hen bird seems specially interested in them. But the stream of evolution seems to be running in this general direction. The

* It has appeared to me—and the fact would be significant—that these characteristics are less marked later in the season, when the hens, being all sitting, do not come to the ground at all.

scene, speaking generally, is of the following description : Some dozen or so of Ruffs are standing or sitting—often dozing—together, quite amicably, on their pairing-ground. Enter a Reeve. There are prostrations, rufflings, bustlings about, dartings hither and thither over the course, with occasional short, sharp encounters, and out of the whole of this the Reeve, quite coolly and as if she knew her business, picks her bird. With this object of her choice she, as a rule, can and does unite herself. If she cannot she flies away. Another time her object will be accomplished. Nothing has been gained by the unfavoured rivals let them have blustered and skirmished "never so." She is not to be compelled, she is not to be intimidated, her caprices cannot be overruled. Thus, practically, she has the power, and it is along the lines of an increasing recognition of this fact on the part of the Ruff that things, as I believe, are advancing. This would lead to more and more reliance being placed by the male on the power of pleasing the female, and less and less upon the likelihood of winning her by force.

As already intimated, I have seen no evidence of the Reeve being impressed by the fighting qualities, or by the "vigour," as such, of the male, or that these are elements of paramount importance in his courtship. In saying that a bird notably deficient in this way, and of a sluggish temper in general, is likely to suffer through such defects, I say all that the facts, so far as they have fallen under my observation, warrant me in saying, which is surely not much, for such a bird loses much more through not being a brisk suitor than by being a dull fighter. The above, however, if we exclude birds not yet in full plumage, and whose position, on that account, is altogether subsidiary, is almost a supposititious case. With one or two doubtful exceptions I have seen no mature-looking, full-plumaged Ruff of the sort. What I have seen strong and sustained evidence of is that the Reeve has the full power of choice, and that she exercises it in such a manner as to make it evident that she chooses this or that bird for himself, for something about him, that is to say, by virtue of which she likes him better than another, either always or at this or that time. I believe that this something is, in the main, his appearance,

and that in so far as vigour may be a selected quality, it is selected only incidentally to this, which, however, would often be the case.

In conclusion, I would urge that the facts here brought forward by me, in regard to four different species of birds, are, both singly and cumulatively, strongly in support of Darwin's second great hypothesis of sexual selection, and I believe that, as denial from the chair is replaced, or supplemented, by evidence from the field, the views of that great naturalist and reasoner will be triumphantly and often most strikingly vindicated.

NOTES AND QUERIES.

MAMMALIA.

Variety of Badger.—In 'The Zoologist' (1904, p. 227) I described a variety of the Badger in which all those parts which are normally black were of a pale brown colour. A similar animal was recently trapped in Hawkstone Park, Shropshire, where there is a large and old-established earth containing more than one pair of Badgers. In this example, however, the eyes were *pink*, although the animal could not be styled an albino.—H. E. Forrest (Hillside, Bayston Hill, Shrewsbury).

Melanic Short-tailed Vole.—On my way to Norfolk I stopped at Ely, and bought a half-grown specimen of the above species. It was of a pure jet-black. As animals of this colour are much rarer than either cream or white, its occurrence is of much interest to collectors of varieties. It was caught in a mowing-field near the city on July 7th, 1907.—J. Whitaker (Rainworth Lodge, Notts).

Daubenton's Bat (Myotis daubentoni) in Hertfordshire.—On Sept. 21st I saw several Daubenton's Bats on the Grand Junction Canal in the neighbourhood of Grove Mill, near Watford. I am not aware of any previous Hertfordshire record, but this Bat is probably not uncommon in suitable localities, and has merely been overlooked.—Chas. Oldham (Knutsford).

AVES.

Status of the Grey Wagtail.—In 'The Zoologist' (*ante*, p. 151) Mr. W. H. Parkin asks for information relating to the status of the Grey Wagtail (*Motacilla melanope*) in the north. In Wensleydale, Yorkshire, a pair of Grey Wagtails are to be found by most of the larger becks running into the River Ure, and *M. melanope* is fairly common, though local, by the River Ure itself. Last summer I saw a small party of eight by one of the falls at Aysgarth, and this constitutes the largest number I have seen at one time in the same locality. I think that *M. melanope* is slightly decreasing in numbers; to what this is due I cannot say. The Grey Wagtail occurs in Wharfedale, where it is local and not very numerous. In the neighbourhood of

Leeds I have noticed it in the spring and autumn when it is migrating up and down Airedale respectively; a few also spend the winter a little to the south of Leeds. In Wensleydale both the Pied and Yellow Wagtails occur, but the Pied, though common, is far exceeded in numbers by the Yellow Wagtail, which is very generally distributed; this is contrary to my experience of *M. raii* round Leeds, where I have found it to be local and far from common.—S. Hole (Rocky Bank, Belle Vue Road, Leeds).

Nesting of the Lesser Redpoll (Linota rufescens) in Kent.—My inclination to place this species in the category of a rare breeding bird for the county is based on many years' experience in ornithological work among the birds of the hop-country, having resided there the greater part of my life, and though having many friends still resident, who have done likewise, it is a significant fact that not one of us had a single authenticated record of these birds ever having bred. It has now fallen to my lot to record three nests, all of which are of recent date. The first of these was found on May 3rd, 1896, by Mr. R. Goodchild, of Farnborough, in one of his father's orchards, and was placed high up in a large greengage tree, and contained three eggs; this nest I did not see *in situ*, but Mr. A. H. Meiklejohn was with me at the time the nest was shown, and we had no difficulty in identifying the nest and eggs, both of which were typical. On the eve of May 24th of this year I received a telegram from Mr. T. Gillah, of Forest Hill, to the effect that he had found a nest containing four eggs at Lower Sydenham (not more than six miles from the heart of London). Losing no time, I at once cycled over, meeting Mr. Gillah at Lower Sydenham Station, who took me to the nest. This was placed in a small beech tree, in a narrow strip of wood on the edge of a field, about fifteen feet from the ground. The bird left the nest as I commenced to climb the tree, and remained there for some time, giving me an excellent view of her. We also visited another nest a short distance away. This was situated in a small whitethorn, but unfortunately was forsaken. References to this species for the county by past writers are so meagre that I have not thought it worth while to refer to them. In conclusion, it is curious that, having had no previous experience with this species, I should find it breeding within a few miles of my own house.—Percy F. Bunyard (57, Kidderminster Road, Croydon).

An Albino Rook.—We have all read, in the 'Natural History of Selborne,' of the two white Rooks "having their bills, legs, feet, and claws milk-white," which were wantonly destroyed by a "booby of a

carter"; and perhaps the occurrence of white or light-coloured birds amongst their sable relations is no great rarity. About the middle of May last I saw a Rook, about three-parts grown, of a uniform creamy or rather dirty-white colour, except a pale brown patch about the size of a shilling on the left side of its head, including the ear-covert; its legs and toes were white, and the beak very ivory-looking; its eyes were pink and apparently sightless, as is often the case with an albino (or at least my experience points in that direction), and its immaturity was indicated as much by its size as the feathered condition of the base of the beak. The plumage was both ragged and dirty, the bird having been kept in confinement for some fortnight or three weeks previous to its death, and I suppose at the time of its capture it had been crippled in some way, as the little girl to whom it belonged told me she threw her hat after it and knocked it down, and that its appearance amongst the other young Rooks was noticed as soon as it was able to leave the nest and get out upon the branches.—G. B. Corbin (Ringwood, Hants).

Little Owl (Athene noctua) in Bedfordshire.—Bedfordshire is without doubt indebted to the late Lord Lilford for the addition of this nowadays resident species to our local fauna, who, after several years' perseverance, succeeded in establishing this species at Lilford, where in 1889 a pair were found with eggs, and other pairs were afterwards recorded from year to year nesting around that locality. In 1889 there is a doubtful record of one killed at Meppershall, in Bedfordshire, some thirty miles distant from Lilford, in the south-east of the county. In 1893 two were obtained at Woburn and Millbrook, in South-west Bedfordshire. In the spring of 1894 it first appeared at Chawston, in the north-east corner of the county, and from that time appears to have made a stronghold of this neighbourhood. The unusual number of old pollard elms that may be seen in the locality is probably the secret of its rapid increase there. In 1897 several were obtained in various other parts of the county, including Turvey, on the west border, and at Cranfield, a few miles further south. In 1898 increased numbers were sent in to the local taxidermists, two of which, shot at Southill and Chicksands Priory, were said to be birds of the year; one was also caught in a brick-trap in a cottage-garden at Lidlington. In 1899 and 1900 localities from which they are reported became more and more general. Luton, in the extreme south, is now first included in the latter year. In 1901 a nest of four young ones was safely reared from a nest at Green End, Great Barford, and also another nest was said to have been successfully reared off in another locality. A female killed at Southill, May 22nd, from along the roadside, was nesting at the

time, a perfect egg being taken from the bird. In 1902 several pairs nested at Chawston and Wyboston, and two young were taken from a nest at Harlington. In 1903 seven pairs were reported as nesting, including a nest at Carlton in a dead tree lying on the ground, and the one reported at Ampthill ('Field,' July 18th). In 1904 young were also reared successfully at Elstow, Renhold, Kempston. From that year its nesting haunts and the numbers killed have been far too numerous to be worth individually recording; if one might venture to estimate their present numbers in that county it would be upwards of two hundred to three hundred pairs, as in every parish they appear to be known and probably nest. It is already the commonest species of Owl, and undoubtedly still on the increase. In April of the present year I saw no fewer than four during a day's ramble, and others on numerous occasions since during visits to that county. Our local taxidermist kept a record of this bird as sent in to him until he had received upwards of fifty, and up to the present time probably three times that number have passed through his hands. He adds:—"I never yet found a feather in their stomachs, always insects or mice. One killed at Goldington was feeding on a Water Shrew. The sharp winters do not seem to affect them in the least." The increase of the Little Owl has unfortunately been accompanied by the decrease of the one-time common Barn-Owl. They are exceedingly noisy at night, and soon make their presence heard. There is no doubt but that in a few years this species will extend its distribution over this country to a very considerable extent.—J. Steele-Elliott (Dowles Manor, Salop).

Variety of Coot's Eggs, and Others.—A river-keeper, who has a collection of eggs, showed me four taken late in June, and he supposed they were other than those of the Coot, but they undoubtedly belonged to that species—and, indeed, the man himself said the nest was very like a Coot's. It is well known that the dark spots upon the eggs of this noisy, quarrelsome bird are generally small, and equally distributed over the entire surface of the shell, but in this case the spots were large, and all collected at the larger end—at least upon three out of the four—and the ground colour being somewhat of a lighter stone shade than usual, the markings were the more conspicuous. As there were but four eggs in the nest, these were slightly incubated, and, being late in the season, it is quite possible they were the produce of a second brood, or at least of a second nest where the first had been robbed. I recollect many years ago taking eggs of the Moorhen not far from the neighbourhood where the above-named Coot's were found,

and the larger ends of those were clouded with reddish brown, as if all the usual spots had collected together, and were then distributed from a common centre, the colouring matter growing gradually lighter as it approached the middle of the egg, until lost in the general ground colour. In egg variation, is the explanation easy as to why the markings are so often gathered at the larger end?—as with this thought I was induced to give a casual glance at the contents of my small oological cabinet, and was interested in finding how many species show such variation, the peculiarity being very marked in Red-back Shrike, Reed-Wren, House-Sparrow, Common Bunting, Blackbird, Redshank, Snipe, and several other species.—G. B. Corbin (Ringwood, Hants).

Ruff near Chester.—I received (Sept. 12th) an immature specimen of Ruff (*Machetes pugnax*), which had been shot on the Dee Marsh, near Chester, and I am told that several other specimens were seen at the same time, but fortunately they did not venture within gunshot. Every year one or more of these interesting birds are more or less observed in the same locality, no doubt on the autumn migration.—A. Newstead (Grosvenor Museum, Chester).

Sandwich Tern in Norfolk.—On Sept. 19th I had a good view of a fine adult Sandwich Tern (*Sterna cantiaca*) perched on the outlet of the town-sewer at Hunstanton, and was able to bring my boat within thirty yards of it. By the aid of good glasses I could plainly see the (for a Tern) long black legs, and, compared with a young Tern of either the Common or Arctic species which sat by its side, it looked quite a large bird. Two days later I saw what was probably the same bird near the pier. One rather wishes that the protection of the eggs of "Terns, Sea-Swallows, Pearls, or Dip-ears" (all species) by the Norfolk County Council could be extended to the birds throughout the year, but happily there is no wholesale slaughter of sea-birds for the feather-market on the East Anglian coast.—Julian G. Tuck (Tostock Rectory, Bury St. Edmunds).

Nesting of the Lesser Tern (Sterna minuta) in the Outer Hebrides.—On the north-west side of North Uist, almost in a line with Loch Maddy, there is a small sandy island called Kirkibost, the northern portion of which is covered with dunes, sloping gently down to high-water mark, which is fringed with small pebbles and the usual flotsam and jetsam peculiar to this part of the shore, and is here the home of a few pairs of Arctic Tern (*Sterna macrura*). While watching these birds my companion (Mr. T. Aldworth) called my attention to

three among them that appeared to be of more slender build and of more graceful flight, suggesting to us at first Roseate Tern, and from their behaviour we felt certain that they were breeding. We at once decided to watch, taking up our position behind one of the dunes. We had barely time to make ourselves comfortable and fix our glasses before one of the birds alighted, and was immediately identified as a Lesser Tern (*S. minuta*); a diligent search, however, failed at first to reveal the eggs. Having resumed our watching, the bird was soon down again, and commenced scratching and shuffling about, at last settling herself down. We then made a concerted rush to the spot as the bird flew off, revealing to our view, though partly covered up by the sand, two eggs, which unfortunately she had broken in her attempt to bring them to the surface of the drifting sand. They were quite fresh (June 18th). As far as I have been able to ascertain, this is the first authenticated record for the Outer Hebrides, and I believe the most northern—and certainly the most north-westerly—for the British Islands (Aberdeenshire). Of late years eggs *appear* to have been taken in the Orkneys (Saunders's 'Manual,' p. 651); Aberdeenshire (Seebohm's 'Eggs of British Birds,' p. 103); Aberdeenshire (Irby's 'Key List,' 327, p. 55). — Percy F. Bunyard (57, Kidderminster Road, Croydon).

White Ringed Plover.—Through the kindness of Mr. Turner, of Swithland, I have been able to add this very rare variety to my collection. Varieties of wading birds are rare. It was shot in Westray, Orkney.—J. Whitaker (Rainworth Lodge, Notts).

Food of the Black-headed Gull.—Referring to the circulars which have been addressed to farmers, &c., by the Cumberland County Council relative to the harmlessness or otherwise of this Gull, may I be permitted to express my views as based on observations in Upper Wharfedale in 1905, at which place I spent my holiday. A good portion of my time was passed between Cray and Buckden Pike—a wild and desolate tract, where the Lapwing breeds in some numbers. Day after day whilst there Black-headed Gulls used to visit this tract, each one of which was invariably mobbed by Lapwings, after which, in some cases, they flew away to some distance, but frequently the harried birds would only fly to comparatively short distances, quickly returning, only to be again repulsed. This went on more or less during the whole time I was there. These visits of the Gulls were not mere chance visits across the sphere of influence of the Lapwings in passing from one part of the country to another. They were here

for some special purpose, and although no direct testimony can be given by me as to the Gull's egg-eating propensity, the presumptive evidence during my stay was so cumulative as almost to amount to a demonstration. In this neighbourhood I had suspected this habit for some years, but the data rested upon insufficient evidence. From a humanitarian point of view I have been somewhat reluctant to mention the above conclusions, but sentiment should not blind us to the true nature of facts.—G. P. Butterfield (Wilsden).

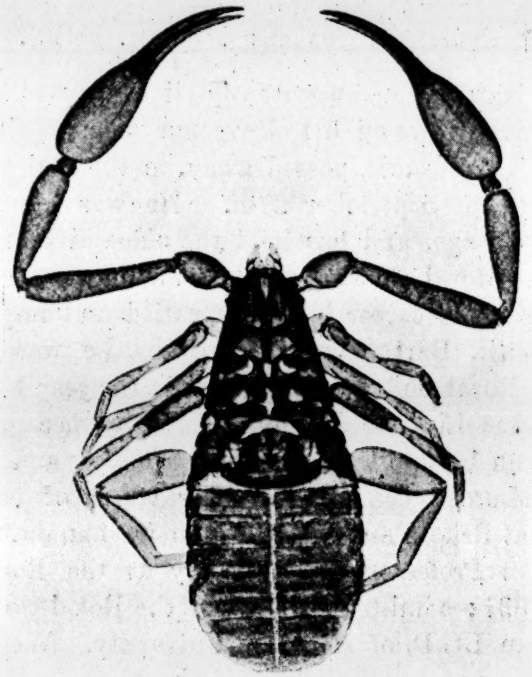
Little Auk in Derbyshire.—When at Sudbury in June last I had an opportunity of inspecting a hitherto unrecorded specimen of the Little Auk, *Mergulus alle* (L.), which is in the possession of Mr. J. Bottrell, of Sudbury. It was picked up dead on the ice of Sudbury Pond on November 29th, 1904, and sent to A. S. Hutchinson, who fortunately noted the date on the case. The bird had been seen about the pond for a day or two previously, and it is interesting to note that another example was shot on the Trent near Donington Park on November 24th, within a day or two of the same time ('Zoologist,' 1906, p. 139).—Francis C. R. Jourdain (Clifton Vicarage, Ashburne, Derbyshire).

Fulmar (Fulmarus glacialis) on the Suffolk Coast.—On Sept. 30th I received from a gentleman in Lowestoft a parcel containing the head, feet, and wings of a Fulmar Petrel, which he had a day or two before picked up, evidently uninjured but dead, on the beach at Corton, two or three miles north of Lowestoft. The head was perfectly white, and the bird was undoubtedly fully adult. Like two or three others I have myself met with thrown up by the tide, I have no doubt the bird had gilled itself in the Herring-nets on the fishing-grounds and been drowned, to be thrown back overboard and carried south and shorewards by the tides. From report, this species appears to be by no means rare thirty or forty miles out in October, consorting with the Gulls, which find a genial occupation among the Herring shoals.—Arthur H. Patterson (Ibis House, Great Yarmouth).

ARACHNIDA.

Chelifer cancroides (Linn.) in Manchester.—This false Scorpion is well enough known to naturalists, but can hardly be called an abundant species in this country. Our present authority on the group, Rev. O. Pickard-Cambridge, when writing his Monograph in 1892, could refer to only four British specimens, all taken in London, and now in the British Museum. Since that date the species has been

discovered in various parts of England and Scotland, in stores and in stables. The accompanying micro-photograph is kindly supplied by Messrs. Flatters and Garnett, Limited, who both prepared the slide



CHELIFER CANCROIDES (*enlarged*).

and took the micro-photograph, and is from a specimen (male)—one of two—obtained in the shop-drawer of a Manchester bakery in 1906. This species is distinguished from the other known members of the genus by the long, slender pedipalps, or second pair of appendages.—G. A. WHYTE (7, Charlotte Square, Edinburgh).

OBITUARY.

Professor Charles Stewart, F.R.S.

Charles Stewart, an apparently light-hearted zoologist who neither wore his sorrows on his sleeve nor his scientific attainments as a cloak of righteousness, passed away, to the real regret of many sincere friends, on September 27th. He was born in Plymouth sixty-seven years ago, and has held the office of Conservator of the Museum of the Royal College of Surgeons for the past twenty-three years. His scientific career has been varied and important. After studentship at St. Bartholomew's Hospital he was qualified as a member of the Royal College of Surgeons in the year 1862. Admitted as a Fellow of the Linnean Society in 1866, he became President of that Society from 1890 to 1894. He was a Fellow and Vice-President of the Royal Microscopical Society; Treasurer of the Anatomical Society of Great Britain and Ireland from its foundation to the year 1891; Fullerian Professor of Physiology at the Royal Institution from 1894 to 1897; admitted a Fellow of the Royal Society in 1896; and was also an LL.D. of Aberdeen University. We first met Professor Stewart when he was Curator of the Museum of St. Thomas's Hospital, now many years ago, and subsequently not infrequently met him at the meetings of the Entomological Society of London. He had a love of all things zoological, and his visits to the British Museum (also not infrequent) were for the identification of the most diverse creatures. He thus gave the Museum of the Surgeons a more general zoological character, especially illustrating our conceptions of organic evolution.

But he was a man of many parts and many interests—equally at home in his museum or at the Savage Club; he was the most genial of all Professors, and the most learned of all the really genial men we ever met. He has left many friends and a deserved reputation.

NOTICES OF NEW BOOKS.

Wild Life in Australia. By W. H. Dudley Le Souëf, C.M.Z.S., &c. Whitcombe & Tombs, Limited.

This is by far the best and most interesting book on the general Natural History of Australia that has appeared since Bennett's 'Gatherings of a Naturalist.' It is crammed with observations on animal life, and is full of illustrations acquired through that truthful medium—the camera. Mr. Le Souëf, as Director of the Melbourne Zoological Gardens, is familiar with his subject, and in this book he confines himself to descriptions and impressions of a fauna in its natural and wild environment. When, as he tells us—and as unfortunately we too well know—that fauna is "fast disappearing," his pages are calculated to be of lasting importance.

Without laying much stress on evolutionary hypotheses, Mr. Le Souëf has contributed much first-hand information on the relation of the colours of animals to their environment, and his observations throw much light on this intricate question. For the ornithologist there is abundance to charm and instruct. The account of a vast nesting colony of the "Straw-necked Ibis" may be taken as a sample. The swamp at the time of visit was about six hundred acres in extent, and the minimum number of these birds was estimated as two hundred thousand, occupying about three hundred acres. This Ibis does not appear to be a mere automaton in mental process. "On one occasion they started nesting, and many eggs had been laid, when some very hot weather came on and the shallow water dried rapidly up. The birds evidently realized that it would be dry before their young were hatched, so they deserted it in a body, and left the eggs for the Crows to feast on." Their food consumption is enormous. "The contents of an average crop of an adult bird, by actual counting, were 2410 young grasshoppers, five fresh-water snails, several caterpillars, and some coarse gravel, which,

multiplied by 200,000, brings up to a big total of 482,000,000 odd grasshoppers, as well as vast numbers of caterpillars and snails." Such facts give sidelights to the carnage that occurs in the struggle for existence! We could multiply extracts that relate to animal bionomics, but our better course is to recommend the perusal of the volume.

We have only one fault to find, or rather one suggestion to make, should another edition appear. Both animals and plants are, as a rule, only referred to by their popular or local names. This may be all very well for an Australian colonist, but the addition of the generic and specific name would vastly assist English naturalists, while for foreign readers it is almost imperative.

The Birds of Yorkshire; being a Historical Account of the Avifauna of the County. By T. H. Nelson, M.B.O.U., with the co-operation of W. Eagle Clarke, F.R.S.E., &c., and F. Boyes. Two vols. A. Brown & Sons, Limited.

In ornithological literature the county histories have gradually acquired a higher standard both in text and illustration; these two volumes have reached the high-water mark! There is such a fulness of detail relating to the large avifauna of Yorkshire, and such a wealth of illustration, that this publication can well rank higher than many volumes that are entitled Histories of British Birds. The Yorkshire Naturalists' Union may be congratulated on their enterprise, while Mr. Sheppard, the Hon. Secretary, has carefully acted as its foster-parent through the press.

There has been a considerable discussion in these pages as to whether the Twite may be considered as one of the "fosterer-Cuckoos." It was erroneously reported as such near Aberdeen by one correspondent, and absolutely denied as ever being such by another writer. In the list of birds acting in this capacity to the Cuckoo we see that Mr. Nelson includes the Twite on the authority (H. B. Booth MS.).

The shore and sea birds would alone make the avifauna of Yorkshire famous. The Dunlin breeds, and not too sparingly, in several areas of the county, and some beautiful illustrations

of the nest of that bird appear in the second volume. "The Curlew's ancestry in Yorkshire is of great antiquity, for it is mentioned in connection with the Nevell banquet at Cawood in 1466, the items at the feast including 'Curlewes 100' (Leland's 'Collectanea')." An excellent photo-block illustrates young Curlews just hatching. The number of photo-blocks of nests and eggs in these volumes give the best guarantee for the preservation of many species. The gun is now much less used by collectors, and nests will frequently have little molestation by the ornithologist who only "takes" them with his camera.

It is, however, unnecessary to give extracts from volumes which most ornithologists and lovers of birds probably already possess. The work has been compiled and written with the assistance of every competent observer and recorder in Yorkshire, and it is in the wise selection of records (for many given in all good faith are sometimes mistaken and not infrequently erroneous) that Mr. Nelson and his colleagues have shown an adequate discretion and a judicious discrimination. This county history can rank as a trustworthy history of British Birds, and that is probably the highest praise that can be given to a local publication.

Malaria; a Neglected Factor in the History of Greece and Rome. By W. H. S. Jones, M.A. With an Introduction by Major R. Ross, F.R.S., &c., and a concluding Chapter by G. G. Ellett, M.B. Cambridge: Macmillan & Bowes.

The argument in this book is of transcendent interest. Was the decline in the Greece of Art and Philosophy and the Rome of Law and Conquest incidental to moral degeneration, or was it due to a physical cause?—the moral degeneration being a subsequence to malaria. Mr. Jones has apparently proved his thesis that malaria was introduced and spread in the area of those two great civilizations, and in doing this he has pursued the historical method, and searched for his proofs among the best of the classics.

So far the argument has not entered the domain of zoology; the full discussion of this point has been allotted to Major Ross, who has found renown in the discovery that the multitudes of

minute animal parasites of the blood which produce malarial fever are carried from man to man by the agency of a class of gnats called Anophelines, which breed in small pools of water on the ground. "Where such pools are numerous, in the hot months of summer and autumn, as in marshy localities, the insects generally abound; and if a patient with the parasites in his blood enters the locality, they become infected by biting him, and then pass the microbes on to any healthy persons they may feed upon subsequently." The suggestion is that the conqueror of Greece was Malaria, not the Macedonian or the Roman, but the disease-carrying Anophelines—a mosquito sufficient to destroy the mighty spirits of the Greeks and Romans. The dire result of persistent and intermittent malaria on the human system, the human will and energy, is detailed by Dr. Ellett.

This small book, therefore, raises a question which is second to none in human interest, and if its argument is accepted, then the mightiest civilizations that the world has produced may be shattered by the agency of a horde, not of barbarians, but of insects—humble dipterons—gnats or mosquitoes, as one may prefer to call them—the Anophelines of entomology. This, indeed, is a romance in zoology: oh, that it might have been suggested to Gibbon and described in his immortal prose!

EDITORIAL GLEANINGS.

In the 'Yearbook of the Department of Agriculture for 1906,' recently published at Washington, Mr. Henry Oldys has published a most interesting paper on "Cage-Bird Traffic of the United States." We read that "three hundred thousand cage-birds, largely Canaries, are annually imported into the United States. Some of these are destined for zoological parks and a few for private aviaries, but the great majority find their way into the hands of those who desire to have a cage-bird or two to brighten the home. This yearly influx of captive birds may seem large, considering the comparatively small number usually in evidence; but it must be remembered that they are scattered over an area of more than three million square miles, and are distributed among a population of more than eighty millions, which allows but four birds a year to every one thousand persons, or about four hundred birds to a city of the size of Columbus, Ohio.

"The practice of keeping live birds in confinement is world-wide, and extends so far back in history that the time of its origin is unknown. It exists among the natives of tropical as well as temperate countries, was found in vogue on the islands of the Pacific when they were first discovered, and was habitual with the Peruvians under the Incas and the Aztecs under Montezuma. Caged birds were popular in classic Greece and Rome. The Alexandrian Parrakeet—a Ring-necked Parrakeet of India—which is much fancied at the present day, is said to have been first brought to Europe by one of the generals of Alexander the Great. Before this living birds had been kept by the nations of Western Asia, and the voices of Bulbuls and other attractive singers doubtless added to the charms of the hanging gardens of Babylon, while in China and Japan the art of domesticating wild birds has been practised for many centuries.

"It is not difficult to account for the motive that underlies this widespread habit. The same spirit that leads to the domestication of wild flowers for adornment of the home and the pleasure derived from their beauty or fragrance is responsible for the similar transplanting of wild birds from their natural homes to those of their captors, and the parallel extends to the subsequent production of new varieties.

"As a people, Americans have less of this spirit than prevails elsewhere. Despite the multitudes of birds weekly entering the country—a single vessel will occasionally deliver ten or fifteen thousand—our interest in avicultural pursuits is comparatively slight. In Europe aviaries are numerous, and their owners maintain a common interest by means of avicultural organizations and periodicals. Bird shows are held annually or oftener in London, Berlin, and many other European cities. A friendly but keen rivalry prevails among the owners of aviaries as to which shall first succeed in breeding species that have not previously been bred in captivity, or in producing new hybrids. The journals and magazines devoted to aviculture serve as a medium of exchange of methods and experiences, and keep their readers in touch with each other. In Germany, particularly, the practice of keeping, rearing, and studying cage-birds is very common. In many a dwelling one room is set apart for birds, and these bird-rooms are not confined to a particular class, but are found in the homes of people of every rank and condition. As long ago as 1880 some two hundred societies of amateurs existed, and several weekly publications and magazines devoted to birds attested the general interest in avicultural pursuits.

"The breeding of cage-birds for sale is a regular occupation in several parts of Europe. Germany produces hundreds of thousands of singing Canaries in the Hartz Mountains, those of St. Andreasburg being unrivalled songsters; in England, Scotland, and Belgium fancy varieties of Canaries are regularly bred for the trade; and at the Royal Society's Zoological Gardens of Antwerp, Belgium, the breeding of many species of foreign cage-birds is systematically conducted.

"The United States has few aviaries, and most of these are devoted to Pheasants and other large birds. For a few years an avicultural periodical was published, but the support it received was apparently insufficient, and at present there seem to be no periodicals and very few associations strictly devoted to aviculture. Hence in this country there is not that community of interest and information that characterizes the avocation in Europe. America supports a few small shows, mainly exhibitions of Canaries; and small exhibitions of cage-birds, mostly Canaries, are usually held as adjuncts to the annual poultry shows of New York, Boston, Chicago, Toronto, and other cities. The breeding of Canaries and cage-birds for the trade in any numbers is practically unknown on this side of the Atlantic.

"*Traffic in Domestic Birds.*—The once extensive trade in native American birds has dwindled to the vanishing point. Formerly

Mocking-birds, Bluebirds, Cardinals, Tanagers, Indigo-birds, and Nonpareils were caught in large numbers, and sold either here or abroad, and more or less trade in other species prevailed. Bluebirds, which are known as Blue Robins or Blue Nightingales in England and France, were imported into England some time before 1869, as in that year they were first bred in the London Zoological Gardens. They are regarded with much favour by amateurs, and have been repeatedly bred in private aviaries. Mocking-birds were bred in French aviaries before 1873. While intolerant of cage mates, they are much valued in Europe for their song, which, however, is there considered inferior to that of the Nightingale—a judgment partly assisted, perhaps, by patriotic bias and association. Scarlet Tanagers and Cardinals are ranked very high in Europe, and frequently win prizes in bird shows. Evidence of the esteem as cage-birds in which the latter are held is shown by the fact that they are listed on the price list of a London bird dealer for September, 1906, at more than $5 apiece. Of interest in this connection is the statement of Gemelli Careri, quoted by Nuttall in his 'Manual of Ornithology,' published in 1832, that 'the Spaniards of Havana, in a time of public distress and scarcity, bought so many of these birds [Cardinals], with which a vessel was partly freighted from Florida, that the sum expended at $10 apiece amounted to no less than $18,000.' Indigo-birds and Nonpareils are valued for their attractive plumage. Of the latter thousands were annually exported to Europe, where they sold for $1.50 to $2 apiece.

"In consequence of the continual trapping to supply the increasing demand, several of these birds became rare in localities where once they had been common. Nearly every State had a law protecting non-game birds, but such laws were at that time imperfectly framed and ineffectively enforced. The usual exception authorizing the keeping of birds in cages as domestic pets was unaccompanied by any restriction on trade, which in consequence flourished. Imperfect as these laws were, they were rendered still less effective by the absence of public interest in their observance and adequate provision for their enforcement. Gradually, however, the influence of the bird-protective movement began to make itself felt, and the laws were improved. One State after another adopted a model law framed by a Committee of the American Ornithologists' Union, which, instead of simply prohibiting the killing of a few birds specifically named, as had formerly been done, prohibited the killing, capture, or possession of all birds other than game-birds and a few injurious species, and interdicted all trade in them. The interest in bird-life awakened by the efforts of this

organization and the various State Audubon Societies caused these laws to be more or less vigorously enforced, and the trade in native birds declined proportionately. Supplies were still obtained, however, from States that had not adopted modern laws, and the export trade to Europe continued brisk. One by one these remaining strongholds were carried by the forces of bird protection, until finally, in 1904, Louisiana, the only State left from which birds were procurable, adopted the model law, and now, beyond a few surreptitious and illegal shipments, the domestic and foreign trade in native American birds has been entirely abolished. Occasionally a small consignment of Mocking-birds or Cardinals is smuggled to Hamburg or some other European port, but the life of the trade is gone.

"*Traffic in Foreign Birds.*—The importation of foreign cage-birds has grown to its present proportion, not only in this country, but in Europe as well, within the last fifty years. Up to the middle of the last century, apart from Parrots and some other of the larger species, few birds were imported into Europe, and as late as 1860 only about sixty different kinds of foreign birds were brought in, and these in moderate numbers. But about this time a rapid increase began, and by 1880 the species imported approximated seven hundred, and the individuals from 500,000 to 800,000. The Japanese Robin, a favourite cage-bird of to-day, was first brought to the London Zoological Gardens in 1886, and the Shell Parrakeet of Australia, now one of the best known of exotic birds, and sold wholesale in London for about $1.37 a pair, was first brought to England by Gould in 1840, and for the next ten years commanded $100 to $125 a pair.

"In the United States the growth of importation has undergone a similar development, lagging, however, slightly behind the European growth. In both cases the sudden invasion of the markets by foreign birds was due to the advantages of quick transportation. When supplies from distant lands were brought by sailing vessels but few birds survived the long voyages. But the steamship afforded opportunity for conveying birds with speed and safety, and dealers were quick to avail themselves of the changed conditions. As long ago as 1865 there was a brisk American trade in foreign cage-birds of all kinds, and by 1880 this had so increased that a single dealer in New York City handled 70,000 Canaries each season.

"*Number of Birds Imported.*—The decline in the trade in domestic cage-birds has doubtless stimulated the trade in foreign cage-birds, which advanced from 235,433 imported under permit of the Department of Agriculture in the year ending June 30th, 1902, to 322,297

in the year ending June 30th, 1906—an increase of 37 per cent. in four years. At the beginning of this period the model bird-protective law previously mentioned had been adopted by sixteen States; at its close it was in force in thirty-five.

"Of the birds imported in the year ending June 30th, 1906, 274,914 were Canaries and 47,383 miscellaneous birds. The Canaries were nearly all raised in Germany. Thirty-three per cent. of the miscellaneous birds were from the Orient, 30 per cent. from Europe, 22 per cent. from Australia, 7 per cent. from Cuba and Mexico, 6 per cent. from Africa, and 1 per cent. from South America. The remaining 1 per cent. were of unknown origin. In addition to these 2700 Canaries, mostly from Germany, and about 6000 Parrots from various tropical countries came in without permit, no permit being issued for these birds when they are unaccompanied by others.

"*How Birds are Secured.*—A peep behind the scenes is always interesting, and when we see diverse and remote regions of the world pouring their treasures of bird-life into our country a desire is awakened to know by what means this is accomplished.

"In some cases the method is as old as the history of maritime commerce. From the time when vessels began to make voyages to other countries sailors have brought back trophies of various sorts, including specimens of the fauna of distant lands. Some birds are still thus brought in and are bought by dealers in the various ports of entry.

"This method, somewhat systematized, prevails at San Francisco, where the trade, temporarily suspended by the earthquake and fire, is now beginning to revive. Supplies are here obtained from the crews of steamers coming from China and Japan, who make a regular business of transporting cage-birds, usually under an arrangement with the steamship companies by which they are employed whereby freight is paid out of the proceeds of sales. The birds thus imported are considerable in number, but few in species, being mainly Java Sparrows, Diamond Sparrows, Chinese Mocking-birds, and other common kinds.

"But most of the birds imported are secured by more highly organized methods. Several of the leading importers maintain forces of men to secure the desired birds either in their native haunts or in European ports to which they are brought by the agents of other importers.

"Parrots are generally taken while still in the nest. During the nesting season the leading American houses send men to Cuba, Mexico,

or South America to obtain stock. Headquarters are established by these agents at some point convenient to the Parrot country, and natives are employed to secure the young birds, which are forwarded to the United States in periodical shipments. Agents have sometimes been sent from this country to Africa to secure supplies of the favourite African Grey Parrot, but these are usually obtained in European ports from vessels arriving with supplies for the large European houses.

"Small birds, other than Canaries, are generally captured with nets. Expert netters continually visit remote regions in the interest of wholesale houses of Hamburg, London, Liverpool, and other large cities of Europe. Similar expeditions are dispatched from New York and Philadelphia to Cuba and Mexico, and occasionally to more distant lands—even India; but the principal American houses maintain connections with establishments in Germany, through which their supplies of Old World and South American birds are more commonly procured.

"Canaries are obtained by agents who visit breeders in the Hartz Mountains, the Tyrol, and other parts of Europe. A few, however, are imported at San Francisco from breeders in China and Japan."